Soil Fertility Priorities

1. Soil pH
2. Nitrogen
3. Potassium
4. Sulfur
5. Starter Fertilizer
6. Micronutrients (Zn, B, Co)
7. Phosphorus (at planting?)
Why, when and how should I apply lime?

Why add Lime?

- *To adjust soil pH to improve fertilizer use efficiency by maximizing nutrient availability.*

Lime when:

- Soil pH < 5.8 on sandy loam & silt loam soils.
- Soil pH < 5.2 on clay loam & clay soils.

How to apply Lime:

- Broadcast lime to fallow fields, or in fall or winter.
- The lime rate should be based on soil test and ideally should raise soil pH to 6.5.
- Pay attention to lime quality: CCE, particle size distribution.

- Crop Age: PC, 1R, 2R, 3R
- Soil Type: Light, Heavy
- N rates: 0, 40, 80, 120, 160 lbs N/A (32% UAN)
- A total of 90 studies
Nitrogen Fertilizer Recommendations for 2020

- **Plant cane:** light soils: 60-80 lb N/A
- **Plant cane:** heavy soils: 80-100 lb N/A
- **Stubble cane:** light soils: 80-100 lb N/A
- **Stubble cane:** heavy soils: 100-120 lb N/A

- Recommendations take into account data from multiple years and soil types.

- Note that these recommendations assume a proper soil pH and an application date of April 1 - 30.
Will Late Fertilizer Application Effect Sugar Yields?

Current N recommendations are optimized for an application date between late March and early May.

Application before this time frame may allow for greater loss of N due to lower uptake from an immature crop.

Application after this date (without adjusting rates) may result in delayed maturity (low TRS), particularly with stubble crops harvested early.

**Goal:** Apply sufficient N to supply crop needs during grand growth stage (maximize tons), but avoid excess N that may interfere with crop maturation (TRS).
Response to Nitrogen Fertilizer
L 01-299, TRS, 2015

P = .05

TRAS

First Stubble

Second Stubble

Nitrogen, lbs N/A

a

a

a

a

a

b

0

40

80

120

160
Nitrogen Rate x Harvest Date, HoCP 96-540, TRS, Plant cane and 1st stubble, USDA, 2008

Plant Cane

- 243 lbs/T
- 240 lbs/T
- 232 lbs/T
- 231 lbs/T
- 226 lbs/T

1st stubble

- 248 lbs/T
- 241 lbs/T
- 238 lbs/T
- 233 lbs/T
- 235 lbs/T

Legend:
- 0
- 40
- 80
- 120
- 160
Response to Nitrogen Fertilizer
HoCP 09-804, Plant Cane, TRS, Hebert Brothers, 2019

P = .05

<table>
<thead>
<tr>
<th>Nitrogen, lbs N/A</th>
<th>TRS</th>
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<tr>
<td>40 lbs</td>
<td>236</td>
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<td>80 lbs</td>
<td>240</td>
</tr>
<tr>
<td>120 lbs</td>
<td>234</td>
</tr>
<tr>
<td>160 lbs</td>
<td>231</td>
</tr>
<tr>
<td>Control</td>
<td>220</td>
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Legend:
- Control
- 40 lbs
- 80 lbs
- 120 lbs
- 160 lbs

Note: The bars with the same letter are not significantly different at the P = .05 level.
Response to Nitrogen Fertilizer
HoCP 09-804, 1st Stubble, TRS, Naquin, 2019

P = .05

Nitrogen, lbs N/A
USDA Potassium Fertilizer Studies, 2011-2019

- Varieties: HoCP 96-540, L01-299
- Crop Age: PC, 1R, 2R
- All soils tested low or medium for potassium
- K rates: 0, 40, 80, 120, 160 lb K₂O/A (KCl)
- Reps: 6
Response to Potassium Fertilizer
HoCP 96-540, 1st Stubble, Tons/A, Ronald Hebert, 2019

<table>
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<th>26</th>
<th>26.5</th>
<th>27</th>
<th>27.5</th>
<th>28</th>
<th>28.5</th>
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<td>a</td>
<td></td>
<td>29.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
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<tr>
<td>80</td>
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<tr>
<td>160</td>
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P = .05

Potassium, lbs K₂O/A
Response to Potassium Fertilizer
HoCP 96-540, 1st Stubble, TRS, Ronald Hebert, 2019

P = .05

Potassium, lbs K₂O/A

TRS

Control  40  80  120  160

205 b

202 b

212 ab

216 a

211 ab

195

200

205

210

215

220
Response to Potassium Fertilizer
HoCP 96-540, 1st Stubble, Sugar/A, Ronald Hebert, 2019

Potassium, lbs K₂O/A

<table>
<thead>
<tr>
<th>Potassium (lbs K₂O/A)</th>
<th>Control</th>
<th>40</th>
<th>80</th>
<th>120</th>
<th>160</th>
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<td>6002</td>
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P = .05
Sulfur (S)

- Varieties: L01-299, HoCP 96-540, HoCP 09-804
- Crop Age: PC, 1R, 2R
- All soils tested low or medium sulfur
- S rates: 0, 25, 50, 75 lb S/A
- Sources: ATS (Liquid), S90 (Granular), AS (ammonium sulfate)
- Reps: 6

Current recommendation: 24 lb S/A, if recommended by soil test. It may be necessary to revise this due to loss of atmospheric sulfur sources.
Response to Sulfur Fertilizer
HoCP 96-540, 1st Stubble, Tons/A, Rodrigue, 2019

P = .05

Tons/A

Sulfur, lbs/A

Control 25 lbs ATS 50 lbs ATS 75 lbs ATS 25 lbs S90 50 lbs S90 75 lbs S90
Response to Sulfur Fertilizer
HoCP 96-540, 1st Stubble, Sugar/A, Rodrigue, 2019

Sulfur, lbs/A

Control  25 lbs ATS  50 lbs ATS  75 lbs ATS  25 lbs S90  50 lbs S90  75 lbs S90

Sugar/A

P = .05

ab        a         ab        ab        ab        ab        b

6243  6807  6375  6082  5868  6197  5380
Response to Sulfur Fertilizer
HoCP 09-804, Plant Cane, Tons/A, Rebecca, 2019

P = .15
Response to Sulfur Fertilizer
HoCP 09-804, Plant Cane, Sugar/A, Rebecca, 2019

P = .15
Response to Sulfur Fertilizer
L 01-299, 2nd Stubble, Tons/A, Richard, 2019

![Bar chart showing the response to sulfur fertilizer with treatments labeled: Control, 25 lbs ATS, 50 lbs ATS, 75 lbs ATS, 25 lbs S90, 50 lbs S90, 75 lbs S90. The chart indicates no significant difference (P = .05) across treatments.]

- Control: 32.7 Tons/A
- 25 lbs ATS: 32.3 Tons/A
- 50 lbs ATS: 31.4 Tons/A
- 75 lbs ATS: 33.7 Tons/A
- 25 lbs S90: 32.5 Tons/A
- 50 lbs S90: 29.7 Tons/A
- 75 lbs S90: 31.3 Tons/A
Response to Sulfur Fertilizer
L 01-299, 2nd Stubble, Sugar/A, Richard, 2019

P = .05

Sulfur, lbs/A

Sugar/A

Control 25 lbs ATS 50 lbs ATS 75 lbs ATS 25 lbs S90 50 lbs S90 75 lbs S90
Response to Sulfur Fertilizer
L 01-299, Plant Cane, Tons/A, Robichaux, 2019

<table>
<thead>
<tr>
<th>Sulfur, lbs/A</th>
<th>Control</th>
<th>25 lbs ATS</th>
<th>50 lbs ATS</th>
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<th>25 lbs AS</th>
<th>50 lbs AS</th>
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<tr>
<td>Tons/A</td>
<td>28.7</td>
<td>29.9</td>
<td>31.8</td>
<td>31.5</td>
<td>29.6</td>
<td>35.9</td>
<td>33.7</td>
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P = 0.05

Cations: c, bc, abc, bc, bc, a, ab
Response to Sulfur Fertilizer
L 01-299, Plant Cane, Sugar/A, Robichaux, 2019

Sulfur, lbs/A

Sugar/A

Control 25 lbs ATS 50 lbs ATS 75 lbs ATS 25 lbs AS 50 lbs AS 75 lbs AS

P = .05

c c bc abc c a ab
Starter Fertilizer

- Varieties: L01-299, HoCP 96-540
- Crop Age: PC, 1R
- Treatments:
  - No starter
  - 0-45-45
  - 15-0-45
  - 15-45-0
  - 15-45-45
- Reps: 6
- No interaction between varieties and starter fertilizer, so data averaged over variety.
Response to Starter Fertilizer
Averaged Over Varieties, Plant Cane, Tons/A, AF, 2019

P = .10
Response to Starter Fertilizer
Averaged Over Varieties, Plant Cane, TRS, AF, 2019

P = .10

TRS

- Control
- 15-45-45
- 15-45-0
- 15-0-45
- 0-45-45
Response to Starter Fertilizer
Averaged Over Varieties, Plant Cane, Sugar/A, AF, 2019

Sugars/A

Control 15-45-45 15-45-0 15-0-45 0-45-45

8072 8024 8925 8456 8769

P = .10

bc c a abc ab
Response to Starter Fertilizer
Averaged Over Varieties, 1st Stubble, Tons/A, AF, 2019

P = .10

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<tr>
<th></th>
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<tbody>
<tr>
<td>Control</td>
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<td>a</td>
<td>ab</td>
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<tr>
<td>15-45-45</td>
<td>42.5</td>
<td>b</td>
<td>ab</td>
<td>ab</td>
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Response to Starter Fertilizer
Averaged Over Varieties, 1st Stubble, TRS, AF, 2019

P = .10
Response to Starter Fertilizer
Averaged Over Varieties, 1st Stubble, Sugar/A, AF, 2019

P = .10
Boron (B)

• Varieties: L01-299

• Crop Age: 1R

• All soils tested low

• B rates: 0, 0.5, 1.0, 1.5, 2.0 lb B/A

• Sources: Liquid, foliar applied.

• Reps: 6

• An increasing number of soil samples have been found to test “low” for boron. Research was needed to determine if a yield response could be obtained with boron application
Response to Boron Fertilizer
L 01-299, 1st Stubble, Tons/A, Dugas, 2019

Tons/A

Control 0.5 lb 1 lb 1.5 lb 2 lb

P = .15
Response to Boron Fertilizer
L 01-299, 1st Stubble, Sugar/A, Dugas, 2019

P = .05

<table>
<thead>
<tr>
<th>Boron, lbs/A</th>
<th>Control</th>
<th>0.5 lb</th>
<th>1.0 lb</th>
<th>1.5 lb</th>
<th>2 lb</th>
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<tr>
<td>Sugars/A</td>
<td>5079</td>
<td>5927</td>
<td>5967</td>
<td>5678</td>
<td>5673</td>
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</table>

b            a             a ab           ab
Response to Boron Fertilizer
L 01-299, 1st Stubble, Tons/A, Ronald Hebert, 2019

P = 0.10

Tons/A

Boron, lbs/A

Control - 0.5 lb - 1 lb - 1.5 lb - 2 lb
Response to Boron Fertilizer
L 01-299, 1st Stubble, TRS, Ronald Hebert, 2019

Boron, lbs/A

Control 0.5 lb 1 lb 1.5 lb 2 lb

TRS

P = .10

180 178 185 192 191
Response to Boron Fertilizer
L 01-299, 1st Stubble, Sugar/A, Ronald Hebert, 2019

P = .15
Questions?